

APPENDIX E

NONPOINT SOURCES, TMDLs AND THE 303(d) LIST

What Are TMDLs and the 303(d) List?

Section 303(d) of the 1972 federal Clean Water Act (as amended) requires states to develop a list of waters that do not meet water quality standards and thus require additional pollution controls. These waters are referred to as "water quality limited" (WQL) and must be periodically identified in each state by the federal Environmental Protection Agency (EPA) or by the state agency designated with this responsibility. In Missouri, this responsibility rests with the Department of Natural Resources. Water quality limited waters requiring additional pollution controls are identified in a document commonly referred to as the "303(d) list." This list, developed by the department, is subject to public review and must be approved by EPA at least every two years.

A strategy for bringing a waterbody back into compliance with water quality standards--that is, for improving water quality to the point where recognized beneficial uses of the water are fully supported--is to conduct and implement the findings of a Total Maximum Daily Load (TMDL) study. A TMDL study addresses pollution problems by systematically identifying the water contaminant causing the water quality impairment, linking it to watershed characteristics and management practices, establishing objectives for water quality improvement, and identifying and implementing new or altered management measures designed to achieve those objectives.

A full TMDL development process determines the pollutants or stressors causing water quality impairments, identifies maximum permissible loading capacities for the waterbody in question, and then for each relevant pollutant, assigns load allocations to each of the different sources, point and nonpoint, in the watershed. The allocations are the "Total Maximum Daily Loads" allowed, although for most nonpoint source contaminants, they are usually annual, rather than daily allowable loads.

Nonpoint source pollutants are substances of widespread origin which run off, wash off, or seep through the ground, eventually entering surface waters or groundwater. NPS pollution results from diffuse sources rather than from discharge at a specific location (such as the outfall pipe from a sewage treatment plant), and the greatest loads of NPS pollution often are associated with a few heavy storm events spread out unpredictably over the year.

These characteristics of nonpoint sources mean that very seldom - if ever - will NPS control programs actually use "Total Maximum Daily Load" allocations as a means to specify or measure pollutant reductions in agricultural or untreated urban stormwater runoff or other typical NPS situations. Consequently, the term "TMDL" may seem awkward when applied to NPS situations. However, quantifiable maximum pollution loads may still be set by larger geographic units (watersheds) and by longer time periods (seasons or years). Also, a "TMDL" program is understood to be a program of special, intensive, and focused strategies for reducing pollution and bringing 303(d) listed waters back into compliance with water quality standards, and this is as appropriate a strategy for NPS as it is for point sources.

WATER QUALITY MANAGEMENT PLANS

A properly prepared, watershed scale, voluntary Water Quality Management Plan (WQMP) can function as a TMDL. To be acceptable as a nonpoint source TMDL, a water quality management plan must be a thorough, objective-driven, adequately funded, fully monitored, long-term, watershed enhancement approach with significant commitment demonstrated by local land owners and managers. The TMDL may also include iterative steps based on monitoring feedback. Most important, the goals and objectives of the WQMP must focus on achieving water quality standards at the earliest possible date. Watershed-scale plans to manage natural resources can take many forms in response to the local situation. Similarly, specific management practices and objectives will be selected to meet the local need.

The department believes that the best solutions to water quality problems are those with broad and active local support and involvement. Citizens all over Missouri are proceeding with watershed enhancement projects. However, in those areas with listed waters where an effective local commitment to water quality improvement is slow to form, the department and other agencies of state or federal government will have to move ahead with whatever actions are necessary to implement the law and protect water quality. If the agencies fail to do so in a timely manner, the requirements may be enforced by citizens through the courts, a likelihood well documented by citizen law suits in a number of states across the nation. The result could be watershed management plans developed and imposed with less local involvement and support than desired. The best way to avoid this unsatisfactory situation is for local citizens and government agencies to join in partnership to sufficiently address water quality problems before impaired waters are added to the 303(d) list or alternatively to remove waters from the 303(d) list as soon as possible.

Removing Waters from the 303(d) List

The waters on the 303(d) list have significant water quality problems which prevent one or more of their beneficial uses from being fully met. Federal and state laws require the protection of water quality and aquatic beneficial uses. Additionally, most Missourians believe our waters must be clean and healthy, not only for the sake of humans but also for the protection of other species, such as fish, which require use of water resources.

There are several conditions which allow a waterbody to be removed from the 303(d) list:

- < The data or analysis used to list the water is shown to be inaccurate or inadequate (i.e., the water quality in question actually does meet standards after all).
- < The water quality standard violated by the waterbody is changed so the waterbody no longer is in violation. This includes the possibility that local conditions may be officially recognized (e.g., allowing a higher temperature in a particular waterbody in recognition of "natural conditions").
- < Water quality improves to meet standards.
- < A fully quantified TMDL covering both point and nonpoint sources is set and implemented.
- < Other pollution control requirements (e.g., stemming from urban stormwater management programs) are determined to be sufficiently stringent to qualify as a TMDL equivalent.
- < A WQMP is approved for implementation as an NPS TMDL.

Basic Elements of a WQMP

A Water Quality Management Plan must include and adequately address these elements:

- < Condition assessment and problem description
- < Goals and objectives
- < Public involvement
- < Proposed management measures
- < Funding strategy
- < Time line for implementation
- < Identification of responsible participants
- < Reasonable assurance of implementation
- < Monitoring and evaluation
- < Maintenance of effort over time

Included within those elements must be information which:

- < Identifies the water quality concerns and their causes, establishes targets for water quality improvement, describes the specific pollution controls or management measures to be undertaken, and demonstrates that the selected measures will successfully achieve the water quality standards.
- < Identifies the mechanisms by which the selected pollution control and management measures will be implemented, and describes the authorities, regulations, permits, contracts, commitments, or other evidence sufficient to ensure that implementation will take place.
- < Describes when implementation will take place, identifies when various tasks or action items will begin and end and when mid-term and final objectives will be met, and establishes target dates for meeting water quality standards.
- < Track implementation of the selected pollution control measures, collects and analyzes information on the effectiveness of the specific measures at achieving the water quality and related goals, provides a "feedback" or "adaptive management" process by which the results of implementation can be used to modify and improve the pollution control program as necessary, and provides information for use in subsequent 303(d) listing or de-listing processes.

Condition Assessment and Problem Description

This element must include a thorough description of the situation including the water quality standards and criteria of concern, including the beneficial uses being impaired; water quality conditions; the types of pollution causing the problems; the sources of this pollution in terms of location, land management practices, natural cause, or other source; and the relative contribution of each source. The water quality action plan must be based on a clear understanding of the problems to be solved and the causes to be dealt with, and constructed on a watershed scale. Thoroughly documenting all the factors in a watershed that influence water quality is very difficult, partly because of natural variability. Therefore, WQMPs must accommodate a degree of uncertainty. But the law requires that water quality standards, including the targets set as part of a TMDL provide a "margin of safety" in protecting the sensitive beneficial uses, and the greater the uncertainty in the watershed condition assessment, the wider the margin of safety must be in WQMP goals to provide that adequate protection. Therefore, enough data and other information should be collected so that the goals may be as focused as possible.

Where information about certain watershed and water quality parameters is more available than others, WQMPs might develop a phased plan that addresses the better understood problems first. Other, less understood issues can be further studies and addressed in a later phase of the plan.

Overall, the point of a WQMP is to employ the best information available at the time to reduce pollution and improve water quality and beneficial use support. The Condition Assessment and Problem Description element of a WQMP is adequate if it can describe problems and their causes well enough to support the objectives and actions proposed in the watershed enhancement action plan.

Goals and Objectives

A statement of the water quality improvement and protection goals of the plan, accompanied by objectives which quantify the desired change in water quality, beneficial use support, pollution loading and/or other measurable indicators of stream or watershed conditions is the backbone of the WQMP. In addition the plan should specify pollution load allocations, assign those allocations to responsible parties, and provide target dates for achievement of the goals and objectives.

"Goals are general statements of intent, policy, and desired outcome or future condition.

"Objectives are specific, quantified statements of products to be created or conditions to be attained. The achievement of objectives is always measurable. WQMP objectives should identify the time frame for implementation, the roles and responsibilities of the various parties involved, how progress will be measured, and how successful achievement will be determined.

Beneficial use support and water quality condition are the ultimate measures of success for a WQMP. Other aspects of watershed condition, such as riparian and upland vegetation, shade cover and stream channel morphology are often quite useful in the short run as indicators of trends that will lead to water quality improvements. It is also useful to track indicators of the successful implementation and maintenance of the program, e.g., public information sharing, provision of technical and financial assistance to land managers, quantities of nutrients appropriately managed, pounds of chemical not applied, creel counts, etc.

Most important, goals and objectives must adequately address water quality issues with the appropriate margin of safety; be realistic and achievable; be measurable; and be matched to the findings in the condition assessment and problem statement.

Public Involvement

Each watershed will have a unique set of interested and affected persons with a stake in developing and implementing the action plan. Ideally those most closely involved in implementation should also be closely involved, right at the start, in development of the plan. Likelihood of success depends on maximizing public and private support.

Private landowners and managers are understandably reluctant to have other people become involved in their private management decisions, but such interference is not the point of public involvement and should be avoided. Emphasis should be on a general understanding of the condition of the watershed, what needs to be done within each land use type on an area-wide basis,

and how everyone in the watershed can work together in a mutually supportive way. Although specific management measures for the watershed must be identified in the WQMP, there is no requirement that they must be approved by any public process.

At a minimum, those who prepare the WQMP are responsible for involving interested and affected persons in the development of the plan, and the WQMP must identify who these interested people are and how they have been involved in the process. Beyond this, distribution of all or portions of the draft WQMP for public review and meetings of interested persons may or may not be appropriate, depending on the local situation.

Proposed Management Measures

Application of effective water pollution controls and management measures is crucial to achieving the goals and objectives of the WQMP. Consequently, the WQMP must be explicit about which management measures, best management practices or systems of practices, and other activities and tasks will be employed to achieve which objectives, where and when the measures will be used and how application of the measures will achieve the stated objectives.

Selection of measures will be very site-specific. The Plan must describe the decision making process by which measures will be selected, how effectiveness monitoring and other inputs will factor into the selection, how interested stake holders will be involved in the decisions, and how changes over time will be factored into the plan.

EPA guidance for selection of management measures identifies criteria for judgement:

- < a data-based analysis showing that the selected measures have been demonstrated to be effective in addressing the issue or objective in question;
- < an explanation of the mechanisms by which application of the measures will be assured;
- < evidence that the measures chosen can lead to attainment of water quality standards within a reasonable time frame; and
- < a plan for tracking the implementation and effectiveness of the measures.

Effective watershed enhancement action plans generally are designed to be flexible and adaptable over time, therefore, opportunity for innovation and revision must be included.

Funding Strategy

A watershed management action plan must estimate the costs of plan implementation (including monitoring) and identify committed and potential funding sources which will support action plan implementation throughout its life span. An action plan with no funding will result in little or no action and will not be adequate to remove a water from the 303(d) list.

The planning goal should be to document committed funding for three years. Beyond that, sources of potential funding, their mechanisms of access and parties responsible for fundraising should be designated. Sources might be public, private, landowner investments, grants, cost-share, in-kind and donations. Planners should explore funding outside the watershed as well.

Time Line for Implementation

A time line for implementation of the watershed improvement measures, for achievement of the plan's objectives, and the attainment of water quality standards is a yardstick against which implementation will be measured. Each objective and associated activities must have starting and completion dates and interim milestones where appropriate.

Achievement of objectives and application of the selected management practices throughout an entire watershed may take years, even decades, so it is desirable to break implementation of the plan into logically sequenced phases. Two general phasing guidelines are: address the causes of problems first, then remediate the symptoms or effects; and work from the top of the watershed downstream. However, in some cases working simultaneously across the watershed or at carefully considered sites may be more efficient. Protection of irreplaceable resources such as threatened or endangered aquatic species should always be considered priority, even if short-term actions do not solve the whole problem or eliminate its causes.

Identification of Responsible Participants

A description of who will do what is crucial to a full understanding of how the WQMP will be implemented, which in turn is crucial to an assurance that the WQMP *will* be implemented.

Reasonable Assurance of Implementation

In order to be acceptable as a TMDL, a WQMP *must* provide reasonable assurance that it will be implemented through evidence that participants in the plan are committed to full and timely implementation, or alternatively, an explanation of how and by whom the implementation of the action plan will be assured.

Assurance that the responsible parties acknowledge and agree to their roles and obligations and how these will be enforced should be included. The WQMP should also address what constitutes a "bad actor" and, within the context of the plan development, a description of how this problem will be dealt with, if it arises.

WQMPs should be voluntarily developed and voluntarily implemented. They should not be narrowly prescriptive in approach but should maximize options from which land managers may select. Furthermore, good WQMPs strongly promote and reward voluntary stewardship efforts. It is necessary, however, to demonstrate this voluntary commitment and to address the potential need for enforcement should the voluntary effort not materialize.

Reasonable Assurance--Commitment may be demonstrated by signed landowner agreements; signed agency or group commitments; signed contracts, loans, licenses, or permits; or, evidence of secured financial support or cost share funding.

Bad Actor--The "bad actor" refers to a participant whose refusal to join with watershed neighbors in constructively addressing the needs of the watershed puts the success of the WQMP at risk. While dealing with "bad actors" can be a difficult aspect of watershed enhancement, the planning process must address how this will be done.

Enforcement Mechanisms--The WQMP must identify the legal or contractual authority which can, if necessary, be employed to assure implementation. Examples include but are not limited to authorities relating to enforcement of provisions of the federal Clean Water Act; permit, lease or contract enforcement authorities of federal and other public land management agencies; enforceable obligations stemming from any grants, loans, fees, taxes, or cost share assistance in funding WQMP implementation; and local ordinances.

Monitoring and Evaluation

Monitoring for implementation and effectiveness of the WQMP should be guided by the goals and the objectives of the plan. Effectiveness monitoring should evaluate not only the immediate results of implementing various management approaches but also the longer-range issue of whether or not the water quality and associated beneficial use support is improving - or is likely to - given documented trends in watershed condition.

Adequate monitoring for a WQMP/TMDL includes tracking implementation of BMPs or other controls; water quality improvements; and progress toward meeting water quality standards. The plans should specify the goals and objectives of the monitoring program - in other words, with it what is being done and what the results will show. Measurable indicators should be delineated as well as who, when, where and how monitoring will occur. Scientific quality assurance and quality control planning and procedures must be a part of the plan.

Water quality itself is an obvious and necessary condition to monitor, but appropriate WQMP objectives relating to other aspects of watershed condition that are related to water quality may also be monitored, e.g., riparian condition. The approach may be adjusted to suit the local situation and the nature of the action plan. Methods and data analysis must follow established conventions, however, and must always be technically sound. A high degree of commitment to ongoing monitoring of project effectiveness is a very important element of the WQMP and funding over the life of the plan an important issue. Failure to carry out monitoring is nearly as serious as the failure to implement the plan itself.

Maintenance of Effort Over Time

It is important for the WQMP to demonstrate an ongoing commitment to long-range plan implementation and to describe how this will be assured over the lifetime of the plan. Commitment should be reflected in the Goals and Objectives, Time Table for Implementation, Monitoring Plan, and Funding Strategy.

In most cases, the problems leading to water quality limitations and the 303(d) listing have accumulated over decades and may require a number of years to remedy. Some management measures can produce results within a year or two. However, it may take several years to implement the type of wide-scale treatments often necessary to improve water quality throughout a watershed, and additional years of continued effort before the new practices have their desired effect - the achievement and maintenance of water quality standards. Measures and practices implemented need to become routine rather than just a temporary fix.

Re-listing Waters on the 303(d) List

Waters which have been removed from the 303(d) list may be re-listed at any time should conditions occur which weaken, compromise or cancel the effectiveness of the WQMP below the level necessary to make adequate progress toward achieving water quality standards. Potential causes for re-listing are: implementation of management measures poorly done or behind schedule, monitoring not carried out, or selected measure ineffective but unrevised.

REFERENCES

Guidance For Developing Water Quality Management Plans That Will Function As TMDLs For Nonpoint Sources, 1997. Watershed/Basin Section, Water Quality Division, Oregon Department of Environmental Quality, Portland, Oregon 97204.